

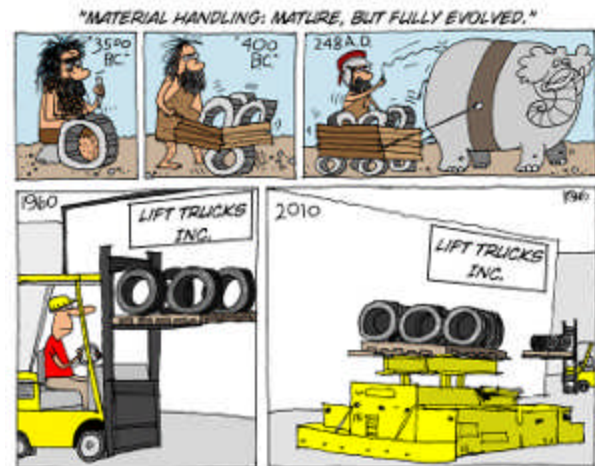
## Material handling evolution taught at Yale

Tom Andel, Columnist

In an industry characterized by frequent model changes, product line consolidation and product reallocation between manufacturing facilities, a plant manager doesn't want to be constrained by fixed production line processes. In fact, John Gardiner likes material handling to be as movable as possible. You need that kind of flexibility when making lift trucks.

Gardiner, general plant manager for Yale Materials Handling Corporation's Americas Assembly Operations, has been a Yale man for 23 years. He started in the company's European operations, where he was introduced to automatic guided vehicles in a manufacturing environment. These AGVs were designed to pickup and deposit specific materials between designated lift truck assembly areas.

He took the pluses and minuses of AGVs with him to Yale's Berea, Ky. manufacturing facility, where he was reassigned a few years ago. The company was in the midst of a product redesign, which gave him the opportunity to modernize the facility. The old method of material movement between assembly stations was in-floor chain conveyor. Mechanical dollies were dragged from station to station. That wouldn't be flexible enough to keep up with the changes going on in the lift truck industry.



Cartoonist: Jerry King, [www.jerryking.com](http://www.jerryking.com)

He wanted flexibility, expandability and ergonomics. From his experience in Europe, Gardiner learned that AGVs might be able to deliver all of those.

"Making sure you had the technology available to expand your system quickly was a key we built into this as we went forward," he said. "The control systems and the control backup were important to get right. We worked with an AGV provider but owned the design of the AGV. The Hyster side of NACCO [North American Coal Company] was already working with AGV Products to develop controls for certain electric forklifts that could be wire guided."

AGVs offer the ability to expand or contract operations easily. If a process needed to change the direction of flow, that too, could

be done easily. Finally, the system controls could be tied into the company's Manufacturing Execution System (MES).

AGVs now service two assembly lines in Yale's Berea, Ky. plant and on the electric lift truck production line of the company's Greenville, N.C. facility. At both sites, AGV location is tracked via the MES system. Quality checks are also tied in between the MES to the AGV. That way, if there's an operational mistake or a torque isn't reached, a signal will keep the AGV from moving to the next station.

Gardiner cautions that AGVs aren't the right solution for every manufacturing line.

"They work well for us because we have a defined layout," he says. "AGVs can also work from a material replenishment perspective. But if you have the presentation of multiple parts to think about, AGVs can constrain you quite a bit. You have to be very defined in your material flow. You still need somebody to dispose of the material once you get it to that point of use. A lift truck driver delivers it and unloads it and puts it away whereas you would need multiple people for an AGV."

One of the biggest benefits of AGVs for Yale's two plants has been ergonomics and the impact on employee health and safety. Before AGVs, the chain conveyor system required considerable manual intervention. Workers would either have to unhook loads from the drive chain or move them by pallet jack.

"We have a lot of different size products and with an AGV you can raise or lower its height for presentation to the operator," he

adds. "There's no interaction with an employee. It comes to his station, it stops and whenever he's finished with his work it moves on. The focus is purely on the task at hand."

The safety and productivity records at the Berea plant have improved significantly as a result. There have been no more back strains associated with the mainline stations. Defects have fallen because AGVs take the control of work flow out of the hands of employees. Movement is programmed based on the takt times of the products. The AGV will start to warn the line worker before its time to move on is reached. Operators do have the ability to override this setting if they get into trouble, but that is rare.

AGVs are now used on two of the three production lines in Berea and on the Class 1 production line in Greenville. Whether they're deployed to other production lines is yet to be determined. Payback time and justification are still to be determined by a volume analysis. It has taken five years to achieve a return on investment for the existing AGV operations. Gardiner attributes that to the recession, adding that if that hadn't hit, payback would have been more likely within two years.

"Although we're still in a repressed market, the economy will come back and there's no better time to get ready than when things are slow," he reasons. "We've done a lot of things to get ourselves prepared for when the volume is back. We started that strategy with our IC product and are doing the same with electric."

Further deployment of AGVs will be justified on a product line by product line

basis. The next likely lines will be Yale's Class 2 and 3 products. If AGVs are applied to those production lines, it will be for very good reasons.

**"We have added three or four different products to the original assembly line**

**thanks to the flexibility of the AGVs," he concludes. "We have mixed model flow. That has set us up very well to respond as the market recovers."**

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